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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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02/04/2001

Huy Thatminh Ton

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26327

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THE LAW OFFICE OF KIRK D. WILLIAMS  
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EXAMINER

TANG, KENNETH

ART UNIT

PAPER NUMBER

2195

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b> 09/776,794	<b>Applicant(s)</b> TON ET AL.	
	<b>Examiner</b> Kenneth Tang	<b>Art Unit</b> 2195	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 December 2006.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,3-10,25 and 34-41 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 3-10, 25, 34-40 is/are rejected.
- 7) ☒ Claim(s) 41 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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### DETAILED ACTION

1. This action is in response to the Pre-Appeal Conference decision to reopen prosecution. Applicant's arguments have been fully considered but are moot in view of the new grounds of rejections.
2. Claims 1, 3-10, 25, 34-41 are presented for examination.

### *Allowable Subject Matter*

3. Claim 41 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. **Claims 1 and 3-4, and 6 are rejected under 35 U.S.C. 102(e) as being anticipated by DeKoning et al. (hereinafter DeKoning) (US 6,457,098 B1).**

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5. As to claim 1, DeKoning teaches a method for dynamic allocation and management of semaphores for accessing shared resources (col. 9, lines 56-67, col. 11, lines 60-67), the method comprising:

maintaining a data structure (semaphore table 410 or linked list, arrays or any similar data structure) indicating for each of a plurality of resources an allocated semaphore (col. 11, lines 33-67);

receiving a request to access a first resource of the plurality of resources from a first task and in response, determining whether or not the first resource is available (determined from the status of the locks), said determining whether or not the first resource is available includes checking the data structure for an indication of the first resource (col. 15, lines 26-30 and 50, col. 16, lines 36-54, col. 15, lines 4-67, col. 13, lines 33-43); and

in response to said determining whether or not the first resource is available determining that the first resource is available: allocating a first semaphore, updating the data structure with indications (message or signal) of the first resource and the first semaphore (col. 19, lines 21-38), and signaling to the first task that the first resource is available (col. 13, lines 52-53, col. 14, lines 49-51, col. 16, lines 15-20, col. 15, lines 4-67).

6. As to claim 3, DeKoning teaches wherein maintaining a current access type (read, modify, write access types) for each of the plurality of resources (col. 4, lines 3-15, col. 9, lines 28-47, col. 12, lines 7-15, col. 5, lines 42-44).

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7. As to claim 4, DeKoning teaches wherein said determining that the first resource is available includes finding an indication of the first resource and an associated current access type of read in the data structure and recognizing that the request corresponds to a read request (col. 12, lines 1-14, col. 9, lines 17-55).

8. As to claim 6, DeKoning teaches comprising receiving a second request to access the first resource from a second task, and in response, referencing the data structure to determine that the first resource is currently read-locked of said current access types; recognizing that the second request corresponds to a read access request; and in response to said determination that the first resource is currently read-locked and recognizing that the second request corresponds to a read access request, signaling to the second task that the first resource is available (col. 9, lines 28-67, col. 15, lines 4-67).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. **Claims 5, 7-8, 25, 34, and 36-38 are rejected under 35 U.S.C. 103(a) as being unpatentable by DeKoning et al. (hereinafter DeKoning) (US 6,457,098 B1).**

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10. As to claim 5, DeKoning teaches receiving a second request to access the first resource from a second task (col. 15, lines 26-30 and 50, col. 16, lines 36-54, col. 15, lines 4-67, col. 13, lines 33-43). DeKoning also teaches referencing the data structure to determine whether the first resource is currently available or not and that reference information is located in the lock table as well as signaling when a resource is available (col. 15, lines 4-67, etc.). DeKoning is silent that signaling occurs when the resource is not available. However, DeKoning does teach “access coordination messages are exchanged for coordinating and updating access information. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the feature of the coordination messages to relay the information when a resource is not available because it would help improve the coordination of access information.

11. As to claim 7, DeKoning teaches further comprising receiving a second request to access the first resource from a second task, and in response, referencing the data structure to determine that the first resource is currently read-locked of said current access types; recognizing that the second request corresponds to a write access request; and in response to said determination that the first resource is currently read-locked and recognizing that the second request corresponds to a write access request (col. 9, lines 28-67). DeKoning is silent that signaling occurs when the resource is not available. However, DeKoning does teach “access coordination messages are exchanged for coordinating and updating access information. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the feature of the coordination messages to relay the information when a resource is not available because it would help improve the coordination of access information.

12. As to claim 8, DeKoning teaches receiving a second request to access the first resource from a second task; and in response, referencing the data structure to determine whether or not the first resource is currently write-locked of said current access types (col. 9, lines 28-67), but if so, DeKoning is silent in signaling to the second task that the first resource is not available.

However, like above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include the feature of the coordination messages to relay the information when a resource is not available because it would help improve the coordination of access information.

13. As to claim 25, DeKoning teaches an apparatus for dynamic allocation and management of semaphores for accessing shared resources (col. 9, lines 56-67, col. 11, lines 60-67), the apparatus comprising:

means for maintaining a semaphore allocation table data structure indicating the currently used semaphores of a plurality of semaphores (col. 11, lines 33-67, Fig. 4, semaphore table 400);

means for receiving a request to access a first resource of the plurality of resources from a first task (col. 15, lines 4-67, col. 11, lines 33-67);

means for determining that the first resource is available, said means for determining that the first resource is available including means for checking the resource lock data for an indication of the first resource (col. 15, lines 4-67); and

means, responsive to said means for determining that the first resource is available, for (col. 15, lines 4-67): allocating a first semaphore including updating the semaphore allocation

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table indicating that the first semaphore is in use (col. 15, lines 4-67, col. 19, lines 31-64), updating the resource lock data with indications of the first resource and the first semaphore, and signaling (access coordination messages or awaiting availability before signaling) to the first task that the first resource is available (col. 15, lines 4-67, col. 19, lines 31-64). DeKoning teaches that all data in the cache should be updated in col. 19, lines 31-64.

14. DeKoning teaches using data resource lock data to determine availability of a semaphore when given a lock request (col. 15, lines 4-67, etc.). DeKoning is silent in that this lock data is arranged in a table data structure. However, DeKoning does use a table for the semaphore allocation data (semaphore table 400) and it would be obvious to one of ordinary skill in the art to use any of the wide variety of data structures such as linked lists, arrays, tables, etc., to associate with the lock data because this simply organizes related pieces of information.

15. As to claim 34, DeKoning teaches including a means for freeing (release) the first semaphore (col. 16, lines 7-20).

16. As to claim 36, it is rejected for the same reasons as stated in the rejection of claim 25. In addition, it is determined whether any free semaphores are presently available in the semaphore table 400 associated with the LUN identified by the lock request. There is a pool of free semaphore stored in the free semaphore list 410. And as already shown in claim 25, updating all information occurs (col. 19, lines 20-64).



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17. As to claim 37, it is rejected for the same reasons as stated in the rejection of claim 25 and 36. And again, the pool of free semaphores is the free semaphore list 410 in col. 15, lines 4-67 of DeKoning.

18. As to claim 38, DeKoning teaches wherein the received resource request is for read access to the particular resource (col. 15, lines 4-67, etc.); and the method further comprises updating the particular entry in the resource lock table structure to reflect an additional read lock associated with the particular resource (col. 19, lines 20-64).

**19. Claims 9-10, 35 and 39-40 are rejected under 35 U.S.C. 103(a) as being unpatentable by DeKoning et al. (hereinafter DeKoning) (US 6,457,098 B1) in view of Kakivaya et al. (hereinafter Kakivaya) (US 6,546,443 B1)**

20. As to claim 9, DeKoning teaches further comprising receiving a second request to access the first resource from a second task; in response to said receiving the second request, referencing the data structure to determine that the first resource is currently not available, and in response, queuing the second request; and in response to the first task releasing the first resource, signaling to the second task that the first resource is available (col. 9, lines 28-67, col. 15, lines 4-67). DeKoning is silent in having timeouts. However, Kakivaya teaches a locking system that supports timeouts and can provide a timeout value as a matter of default, or a parameter can be

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provided with the lock request specifying a particular time out value (e.g. milliseconds) (col. 13, lines 43-54). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify DeKoning's locking system to include the timeout feature of Kakivaya because it would help avoid deadlock as well as have efficient synchronization (col. 3, lines 1-16). Kakivaya also discloses that when a thread times out, the typical reason is because of failure (col. 13, lines 51-53). It would be desirable and obvious to release the first resource within a timeframe of the timeout in order for it to meet the deadline and to be successfully done.

21. As to claim 10, it is rejected for the same reasons as stated in the rejection of claim 9. In addition, DeKoning in view of Kakivaya is silent that signaling occurs when the resource is not available. However, DeKoning does teach "access coordination messages are exchanged for coordinating and updating access information. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the feature of the coordination messages to relay the information when a resource is not available because it would help improve the coordination of access information.

22. As to claim 35, DeKoning is silent in teaching wherein the first semaphore is associated with a timeout value; wherein said means for freeing the first semaphore includes being responsive to a timeout of the first semaphore based on the timeout value. However, Kakivaya teaches a locking system that supports timeouts and can provide a timeout value as a matter of default, or a parameter can be provided with the lock request specifying a particular time out value (e.g. milliseconds) (col. 13, lines 43-54). It would have been obvious to one of ordinary

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skill in the art at the time the invention was made to modify DeKoning's locking system to include the timeout feature of Kakivaya because it would help avoid deadlock as well as have efficient synchronization (col. 3, lines 1-16).

23. As to claim 39, it is rejected for the same reasons as stated in the rejection of claim 35. In addition, DeKoning's invention involves awaiting when a resource is available (see above rejection). DeKoning in view of Kakivaya would signal to the first task that the particular resource is available before the end of a timeout if the resource is available. It would not if the resource is not available. However, DeKoning in view of Buckler satisfies the broadest reasonable interpretation of claim 39.

24. As to claim 40, it is rejected for the same reasons as stated in the rejections of claims 25 and 35.

### ***Response to Arguments***

25. During patent examination, the pending claims must be "given their broadest reasonable interpretation consistent with the specification." *In re Hyatt*, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1667 (Fed. Cir. 2000). Applicant always has the opportunity to amend the claims during prosecution, and broad interpretation by the examiner reduces the possibility that the claim, once issued, will be interpreted more broadly than is justified. *In re Prater*, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-51 (CCPA 1969).

26. Applicant's arguments have been fully considered but are moot in view of the new grounds of rejections.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth Tang whose telephone number is (571) 272-3772. The examiner can normally be reached on 8:30AM - 6:00PM, Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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